

SPECIAL ARTICLE

TOWARD A TOTAL PRACTICE OF MEDICINE: PREVENTION AND MEDICAL CARE *

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World War II and the years thereafter have brought many changes in the nature of the diseases and injuries that affect man. As a consequence, an equally material change is to be seen in what constitutes medical practice. A significant alteration is in the diseases primarily responsible for deaths in general populations.¹ Judgment is usually based on a list that includes the ten leading causes. Over a course of 50 years, well-established leaders have disappeared from that register, and other and sometimes new diseases have taken their place; shifts in rank have characterized the health experience of most countries. A general feature more or less consistently manifest in all countries is that year by year the acute communicable diseases are responsible for fewer deaths. Degenerative and neoplastic diseases acquire increasing importance, to such extent that in much of the world they are now the main consideration.

The latter circumstance is typical of the United States; it holds also for most European countries, Canada, and some others. In the year 1900, five infectious diseases were among the ten major causes of death in the United States. Tuberculosis was in first place, the pneumonias in second. In 1960, only two infectious diseases remain in this category. They are still the same tuberculosis and pneumonia, but both rank well down; indeed, tuberculosis barely makes the list.

In Turkey, the ten most common causes of death include at the present time four acute infectious diseases. Generally they rank high, although no one is in first place. As in so many other countries, chronic diseases of the heart, cancer of various forms, circulatory disturbances and accidental traumatic injury become increasingly important. The common causes of death in Turkey as of now would appear to be in a transitional stage, somewhere between conditions in America in 1900 and the situation now characteristic of that country. There can be little doubt that the future health problems of Turkey will be more and more with the chronic diseases and decreasingly with the acute infections.

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Social Factors in Disease Causality

Another outstanding feature of present day medical practice is an increasing concern with the social aspects of disease, first as factors in causation, and consequently as an important consideration in prevention and control.² For many years, concepts of causality centered on a single factor, a specific agent of disease, the *sine qua non* without which disease was impossible. This interpretation was natural enough when the communicable diseases were the main deterrents to health in man; it came as a logical consequence of the discovery of microbial causes for so many diseases.

As other morbid processes gained significance among health problems, chiefly because the infections began to respond to measures for prevention and control, the idea of a multifactorial causality³ of disease in man progressively gained support. Most diseases of degenerative, neoplastic or metabolic nature have no demonstrable specific agent. The demonstration of multiple factors in their origin was an outstanding contribution to improved understanding. With a variety of causes recognized in these processes, a new view developed about the communicable diseases; other factors than the specific agent were identified as having a prominent part in their genesis. The main attention was directed at first to other biological factors, particularly the characteristics inherently a part of the human host.

Interest soon turned to an imposing variety of social factors likewise involved in causality. As much as for any other disease, this state of affairs became evident for tuberculosis, where Winslow crystallized opinion in stating that the tubercle bacillus, indispensable as it is, is not *the* cause of tuberculosis although it is clearly one of the important causes. A present day evaluation suggests that social factors have a significance in the origin of tuberculosis equal to other groups of etiologic factors whether resident in the agent of disease or in the host attacked. The lesser frequency of cases and deaths from tuberculosis now evident in so many parts of the world seemingly is as much the result of improved social conditions as from any effect relating to the professional activities of physicians or other public health workers.

The prevention and control of mass disease in man depends upon effort specifically directed toward identified causes. With social factors now approximating biological factors in an interpretation of disease causality, it follows logically that a fresh influence is exerted on prevention, whether in the practice of public health by the official agencies of government, or of preventive medicine by

clinicians. The technics of the social sciences become an integral part of general methodology. In many countries, the phrase *social and preventive medicine* is preferred over the older and yet inclusive term, *preventive medicine*. In some circles, preventive medicine has been called "the social arm of medical practice."

Society and Medical Service

The social sciences have had further impact on clinical practice in the practical matter of provision of medical services. The extent to which governmental authority has assumed responsibility for medical care varies from one country to another. Medicine in Great Britain is almost wholly socialized. Other Western countries, especially those of Europe, have a policy that furnishes medical service to various fractions of the population, or in the management of particular diseases, or under special conditions of need. The national program is sometimes fairly comprehensive. About one third of medical care in the United States is estimated to be on a socialized basis, mainly services provided the indigent, military populations and their dependents, government employees, and others.

Recognition of prevention as a fundamental part of medical practice, essentially coordinate with medical care, has had strong support in many countries of the world, particularly those with a technically underdeveloped economy. The system is especially favored in Asia and in South America where such combined effort alone gives promise of improved health conditions, a result not to be anticipated from curative medicine alone. As a consequence, and considering the world as a whole, both public health practice and clinical medicine have experienced material changes, in relation one to the other and in individual characteristics.

In former days, when the communicable diseases were the main health consideration, the sources of disease in man were mainly environmental. A shift to an origin strongly related to the human host is an outstanding feature of recent times; disease in man becomes more and more man-made, with the causes identifiable in the things that man does to himself and to his environment. Illustrations are on every side, whether the concern is with mass injury or mass disease. The health problems that stem from ionizing radiation or air pollution are as revealing as any; none is more indicative of a new world of causation than the injuries and deaths from motor vehicle accidents.

As a result, two general trends mark an altered practice of medicine. In the first place, clinical concern enlarges from an objective essentially limited to the sick person and the care of his illness, to include the fundamental matter of prevention, not for the patient alone but for the family group. A second and more fundamental movement is the transition from a practice of medicine concerned mainly with the individual person to a medicine applicable to whole populations. Both developments bring a need for epidemiology, because that science is the diagnostic discipline of preventive medicine,⁴ and the counterpart of clinical diagnosis.

Despite altered attitudes and practices, medicine continues to hold to its time-honored objectives; only the unit of observation is different. Attention turns from a single person who is ill to the health problems of a whole population, including both the sick and the well. The result is an ever enlarging public health. Prevention, however, has no restriction to a function exerted by government nor is its application limited to groups of people. The point has been made that prevention increasingly becomes a recognized part of good medical care of a patient. A distinction thus exists between preventive medicine and public health. Public health has to do with those preventive services provided by public or official agencies under circumstances where the individual of himself is unable to accomplish that purpose. The provision of a safe and adequate water supply is a necessary obligation of the community through its official agencies; the individual can not be expected to accomplish this personally. By contrast, the concern of preventive medicine is with those services primarily a function of the private practitioner of medicine, relating to the individual patient, and independent of any direct effect on the community.

The Place of Preventive Medicine in the Medical Curriculum

The more impressive position of preventive medicine in the scheme of medical education and in the practice of medicine is mainly a postwar development since 1945. Before 1940, only some eight medical schools in the United States had independent departments of preventive medicine and a full-time faculty. Today, some sixty-eight of the eighty-two medical schools of the United States have formally organized departments of preventive medicine.

For years, pediatricians have taken the lead among medical practitioners, general or specialized, in combining prevention and treatment to give a comprehensive practice of medicine. Obstetricians are not far behind. This sort of effort has come to be expected of them. The significant feature in recent years is that general practi-

tioners have given stronger emphasis to preventive measures, and likewise most of the remaining specialties. The trend has extended even to the practice of surgery, despite the common and casual assumption that surgeons have little opportunity or inclination for preventive activities.

Largely because of experience in World War II, accidental and other traumatic injuries have come to be appreciated as in large measure preventable.⁵ Two major teaching hospitals of the Harvard Medical School instituted clinics for preventive surgery soon after the return of the respective chiefs of surgery from war service. The main activity is with accidental traumatic injury, a field once interpreted as largely belonging to industry. A broader scope is now recognized because, at least in America, the accidental injuries in the home, in public places, and on motor highways, outweigh in frequency and importance those that come from industry. The situation has not developed by chance. Industry first recognized such events as preventable and introduced a system of educational measures and remedial procedures directed toward their limitation.

Accidental injuries have been associated for a long time with crowded urban populations and a highly developed industrial life. Adequate appreciation of similar situations in rural regions has only come within recent years. Field studies just ended in India have demonstrated accidental injury to be the third ranking cause of death in the particular agricultural populations observed. In arctic regions the physical environment is so formidable that accidental injury now ranks first among causes of death, exceeding tuberculosis, which for many years was the primary consideration in those and many other regions.

New technics and the improved status of prevention in medical practice brought need for an expanded and even a new kind of epidemiology. Preventive measures have small chance of success unless directed at identified and vulnerable causes. To meet this demand, epidemiology developed in a variety of directions.

Scope of Epidemiological Activities

Field study by epidemiological methods in earlier days dealt chiefly with epidemics, those unexpected outbreaks of disease often so devastating that human activities were sharply overwhelmed and social and economic progress sometimes inhibited for years. The control of outspoken epidemics came to be, in the course of time, recognized for what it was, a temporizing measure, a patching-up of

difficulties after the damage was done. The more effective endeavor was to focus on the entire process, the beginning and the end as well as the active epidemic, in search of why and how communicable disease escaped its conventional boundaries. Satisfactory control evidently depended on an ability to identify the factors involved in the rise and fall of such outbreaks. This brought into play the principles of ecology;⁶ a recognition that these epidemic disturbances were the result of an interaction between a host population and its environment, and that factors giving rise to the phenomenon rested in one or other of these elements. The principles thus identified led to a practical program proved effective in all parts of the world.

The record of accomplishment in European and American communities is such as to relegate the communicable diseases to a secondary position among causes of death, and to an appreciable extent as the responsible factor in general morbidity. In some areas the change is no less than striking. When I first knew Boston, twenty-two years ago, the city had three hospitals wholly devoted to the acute communicable diseases; and all were active and busy. Two years ago, the last of the three closed its doors, and I ended my long service as consulting physician. The communicable diseases have not been eradicated in Massachusetts, but incidence is at such low levels that patients are now cared for adequately at home or in general hospitals.

The advances made in control of the communicable diseases have had two results. In the first place, diseases of other nature gradually took the place of the infections as dominant factors in mortality and morbidity. The implication also was clear that if epidemiologic methods had contributed so heavily to this satisfactory result through identification of causative factors, institution of preventive measures, and promoting a concerted community action, then these were also the likely means of attack on the morbid processes that had taken their place. The principles of prevention and control that evolved from experience with the communicable diseases thus came to be employed in a variety of other community diseases.⁷

Nutritional disorders had early attention. As a matter of fact, field investigations now recognized as epidemiologic field studies were instituted many years ago at a time when communicable diseases were still the major consideration. The first efforts were with the specific nutritional diseases of scurvy, beri beri, pellagra and others. In the mill villages of southern United States, Goldberger demonstrated the lack of a specific nutrient as the causative factor

in pellagra. Indeed, this established a new principle: that absence of a specific agent could act etiologically as well as its added presence. The field study of nutrition by epidemiological methods subsequently has reached into most aspects of food and food supply and from famine to obesity. As with the communicable diseases, the early effort was with the more acute conditions. Rather promptly, interest extended to the ordinary endemic dietary disorders, the association of nutrition with infection, and the relation of nutritional deficiencies to chronic degenerative processes.

The rise of the chronic diseases of mankind as problems of the public health is a development of the past twenty-five years. As such, they are amenable to epidemiologic analysis. In many countries, the chronic degenerative, metabolic and neoplastic diseases are now the first objective in public health programs, and the main concern in epidemiologic activities. Field investigation has enlarged the understanding of causality, in respect to heart disease, cancer, diabetes, arthritis, numerous neurological conditions, and others. In evidence of the value of these methods, a formal organization for field epidemiological studies exists in all of the National Institutes of Health of the United States. These newer developments find a further favored outlet in an epidemiology of mental illness⁸ and in field study of population dynamics.⁹ Viewed broadly and internationally, these last two activities transcend all others in potential contribution to the health and welfare of mankind in this modern world.

Within as recent a time as the past five years, the problems of traumatic injury have been accepted as an integral part of official health programs. This condition ranks more or less universally as about the fourth cause of death. Traumatic injury has special significance through demonstration in United States populations, and presumably generally, that it is the first cause of death for children of all ages from one year to adulthood, and continuing through the thirty-second year. The cost of these young lives is not always appreciated. The numbers are appreciably great; the more important consideration is the number of years lost by reason of early death. Furthermore, these are potentially the most productive of all years.

Preventive medicine and epidemiology have attained an improved position in research and medical education. This scarcely would have come about other than through an awareness by the profession generally of the usefulness of these disciplines and their potential contribution to a broadened and more efficient practice of medicine. That becomes evident in a variety of directions.

The Social and Preventive Components of Medical Practice

An outstanding feature of clinical medicine today, compared with a quarter of a century ago, is the emphasis now placed on the social aspects of disease. It becomes progressively apparent that when one member of a family becomes ill, that event is reflected in varying degree on all members of the family configuration. A child contracts measles soon after entering school. One assured effect is that the infection will be transmitted to younger brothers and sisters who have not had the disease; and measles always carries an increased hazard when it occurs at early ages. Nursing duties draw on the rest and welfare of the mother, and to a large extent exhaust the time ordinarily available to older children of the family. The head of the household assumes obligations outside his regular job; and the loss of sleep and attendant anxiety often are reflected in his working efficiency. What happens is that even so simple a disease as measles does not attack the single child, but in varying degree affects all members of the family group, sometimes extensively. As such, the problem is social. The family is a small group but the problem, for its successful solution, requires the technics of group study as distinguished from those applicable to the individual. This brings into play what John Paul of Yale has termed clinical epidemiology,¹⁰ the study of disease as it affects the patient and the immediately contiguous group. With epidemics no longer a major consideration, the main obligation is to recognize those small fluctuations of communicable disease in a community so characteristic of endemic behavior. This involves measurements of prevalence and incidence rather than epidemic study.

With prevention an accepted part of medical practice, the recognition of causative factors in any disease situation requires attention to those inherent in the group associations of man, as well as those peculiar to the individual. Since the beginning of medicine, the clinical study of disease has been the major reliance in the search for new knowledge and understanding of morbid processes, the end purpose being their alleviation or prevention. The modern era brought laboratory investigation as a sound and important adjunct; in a brief existence, these procedures have contributed more to the known facts about disease than any other approach. The recognition accorded social medicine and the realization that non-communicable diseases have important group manifestations has led to new developments in field method and epidemiologic study, the third general method by which knowledge of medicine grows. Basically the gain

has been in study of the family group, but much enlarged to encompass the community, the town, and sometimes even national influences on frequencies of disease.

A most practical application of social medicine and its diagnostic discipline of epidemiology is in evaluating various features of medical practice, to include bedside management of disease, general therapeutic method, prognosis, and the clinical trial of newly developed drugs and chemicals. Clinical opinion based on a series of one case no longer has much weight in evaluating therapeutic and prophylactic measures. Judgment now depends on direct observation, with controls, of sufficient people from representative parts of a population to permit sound appraisal. That in turn requires that the phenomenon itself be susceptible to measurement, that items be counted, and that the proof derived will stand statistical test. One of the better known examples of modern procedure is the 1954 field trial of poliomyelitis vaccine, involving thousands of persons and a variety of environmental conditions. The evaluation of clinical procedures and clinical results progressively acquires scientific exactness.

A Different Public Health Practice

The increased emphasis on social interests and procedures has had a profound effect on present day activities in public health (as distinguished from preventive medicine), and on the direction of efforts. The earlier public health worker gave primary attention to environmental sanitation, such matters as water supply, the disposal of wastes, and the protection of food supplies. These obligations now devolve primarily on the sanitary engineer, and no longer are the primary obligation of the medical officer of health. To be sure, these affairs continue within the broad scope of public health, and the medical officer of health has general supervision of and coordinates it with what is done with other parts of the general health program. The work of the day, however, rests in more competent and more specialized hands. Some modern texts on public health recognize this departure to such extent that these matters have little or no attention.

The days when the public health expert was looked upon as something wholly apart from the practitioner of medicine are fast disappearing. A principal reason is that the mass measures for prevention and control of disease which worked so well when the disease at hand was typhoid fever and a water supply had to be purified, are less well suited to the major health problems of today. Because of their nature, the bulk of present day preventive measures are of

necessity applied to individuals rather than to the community at large. The technical procedures are those of clinical medicine. Public health education has become a more potent force than sanitation of the environment, not that the latter has lost its usefulness, but rather that the general principles of cleanliness and orderliness have become so firmly fixed in the culture of most peoples. The nature of the killing diseases of the present time has brought these changes.

Much of the program for prevention of the community diseases of today is better suited to the private practitioner than to application through official agencies, the health departments of communities. To a certain extent, the services required are things that he alone can accomplish. These are the conditions that have brought prevention into the general practice of medicine, and made preventive medicine an obligation of all practitioners.

Public Health as a Medical Specialty

As preventive medicine increases in scope and extends in so many new directions, more physicians are taking up this work as a medical specialty. Qualification as a public health expert, and a concentration of activities in that field, corresponds to the special as contrasted to the general practice of preventive medicine. The demand for such specialists increases because of recognition on many sides of the favorable opportunity for cultivating international understanding of peoples through the common concern about health and disease. The World Health Organization enlarges its program year by year, with almost every country of the world participating in the provision of resources and qualified workers. Under sponsorship of governments, the great philanthropic foundations and the universities of the world, research in preventive medicine is an ever expanding institution, both locally and internationally. Society continues to support in liberal fashion the voluntary and official agencies engaged in provision of health services to general populations.

This practice of preventive medicine and its basic discipline of epidemiology is a rewarding career. It has taken me from the arctic to the tropics, and to a familiarity with interests as divergent as the communicable diseases, nutritional disturbances, population dynamics and motor accidents. It has led to long service in Roumania, in Britain, in India and in Africa, and so many way stations that I lose track of them. This is the practice of medicine wholesale, a concern with the medical needs of populations rather than of individuals. It embraces the problems of health¹¹ as well as of disease; and all in relation to the general welfare of man.

Cold fact attests that no illness of human populations ever has been eliminated by treating all persons sick with the disease. The gains have come through prevention. A modern concept of public health requires that the old-time principles of hygiene give way to those of preventive medicine.

Conclusions

Preventive medicine is of such nature as to compel a broader participation in its application than through official health agencies; much reliance for successful accomplishment is on the individual practitioner. In essence, and in varying degree according to the particular medical specialty, the obligation is as imperative as to treat the sick and wounded. In every country and in most branches of medicine, the physician is accepting this obligation for field study of disease as it occurs in the family group and in the larger community. In Turkey I have learned with much interest of the clinical and epidemiological studies now under way on porphyria in a rural region.

The deficiency of the moment is not so much in failure to appreciate this expanding emphasis on prevention as in the slowness with which the idea is being put into practice. The fault lies, to a considerable extent, in our present day teaching of preventive medicine. Students leave the medical curriculum knowing too little of the content of modern preventive medicine and almost nothing of the technics of epidemiology. The trend toward social and preventive aspects of medical practice and the promise of a broader and more satisfying opportunity is appreciated. What the student needs is better information, in order that he may take part in this game of epidemiology and preventive medicine in a professional rather than an amateur capacity.

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